

## H33M-07: Linear Subpixel Learning Algorithm for Land Cover Classification from WELD using High Performance Computing

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**Wednesday, 13 December 2017**

**15:10 - 15:25**

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In this work, we use a Fully Constrained Least Squares Subpixel Learning Algorithm to unmix global WELD (Web Enabled Landsat Data) to obtain fractions or abundances of substrate (S), vegetation (V) and dark objects (D) classes. Because of the sheer nature of data and compute needs, we leveraged the NASA Earth Exchange (NEX) high performance computing architecture to optimize and scale our algorithm for large-scale processing. Subsequently, the S-V-D abundance maps were characterized into 4 classes namely, forest, farmland, water and urban areas (with NPP-VIIRS – national polar orbiting partnership visible infrared imaging radiometer suite nighttime lights data) over California, USA using Random Forest classifier. Validation of these land cover maps with NLCD (National Land Cover Database) 2011 products and NAFD (North American Forest Dynamics) static forest cover maps showed that an overall classification accuracy of over 91% was achieved, which is a 6% improvement in unmixing based classification relative to per-pixel based classification. As such, abundance maps continue to offer an useful alternative to high-spatial resolution data derived classification maps for forest inventory analysis, multi-class mapping for eco-climatic models and applications, fast multi-temporal trend analysis and for societal and policy-relevant applications needed at the watershed scale.

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